

# PATENT ABSTRACTS OF JAPAN

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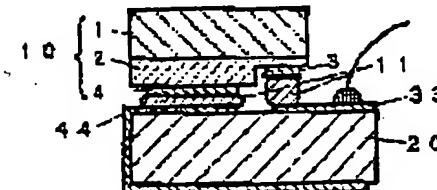
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## (54) GALLIUM NITRIDE COMPOUND SEMICONDUCTOR LASER ELEMENT

### (57) Abstract:

PURPOSE: To permit continuous oscillation at a room temperature by a laser element composed of a laser diode chip formed of gallium nitride compound semiconductor with a sapphire substrate by improving heat dissipation from the chip.

CONSTITUTION: A laser diode chip is formed by laminating a gallium nitride compound semiconductor layer 2 on a sapphire substrate 1. A positive electrode 4 and a negative electrode 3 are formed on the same side of the laser diode chip and a positive electrode 44 and on the other hand a negative electrode 33 are metallized on the same side on an insulating heat sink 20. A laser diode chip 10 is placed and connected on the heat sink 20 so as to permit the electrodes to face each other.



### LEGAL STATUS

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[Claim(s)] 7-235729

[Claim 1] The gallium-nitride system compound semiconductor laser element which the laminating of the gallium-nitride system compound semiconductor layer is carried out on the surface of silicon on sapphire, and is characterized by being laid and the laser diode chip with which it comes to form the electrode of positive and a negative couple in the same side side of the gallium-nitride system compound semiconductor layer becoming the insulating heat sink with which metallizing of the electrode pattern of positive and a negative couple was similarly carried out to the same side side so that mutual electrodes may counter.

[Claim 2] The buffer layer to which the aforementioned gallium-nitride system compound semiconductor layer becomes order from a silicon-on-sapphire side from GaN, GaAlN, or AlN, n contact layer which consists of n type GaN, and the clad layer which consists of n type GaAlN. The gallium-nitride system compound semiconductor laser element according to claim 1 characterized by coming to carry out the laminating of the barrier layer which consists of non dope n type InGaN or Si dope n type InGaN, the clad layer which consists of p type GaAlN, and the p contact layer which consists of p type GaN.